

**Notice of Allowability**

Application No.

10/659,877

Examiner

Henry S. Hu

Applicant(s)

FUKUSHI ET AL.

Art Unit

1713

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE/IDS of June 30, 2006.
2. ☒ The allowed claim(s) is/are 1-16 and 18-20.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 6-30-2006
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### DETAILED ACTION

1. Applicants' 2<sup>nd</sup> RCE and newly submitted IDS both filed on June 30, 2006 were received. The examiner has considered all references including 14 US patents, 6 foreign patents and 15 non-patent references as specified in new IDS. However, none of them can be used as a prior art.

**It is noted that the Applicants have already paid issue fee on March 31, 2006 for previous allowance.** With independent Claim 17 being cancelled on previous examiner's amendment, **Claims 1-16 and 18-20 are now pending** with two independent claims (Claim 1 and Claim 18). An action follows.

### *Allowable Subject Matter*

2. Claims 1-16 and 18-20 are allowed.
3. The following is an examiner's statement of reasons for allowance: The above claims 1-16 and 18-20 are allowed over the closest references:
4. *The limitation of parent Claim 1 in present invention relates to **a compound comprising:***  
*(a) **an amorphous copolymer** including inter-polymerized monomeric units derived from one or*

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*more perfluorinated vinyl ether monomers of Formula I or II; and (b) a curable component including at least one filler, present in an amount of at least 10 parts per 100 parts of component (a), such that upon vulcanization the resulting compound has: (A) a Shore A hardness according to ASTM D2240 of 60 or greater, (B) a TR-10 of -25°C or less, and (C) a permeation of 65 (g-mm/m<sup>2</sup>-day) or less.*

*Other parent Claim 18 relates to the process of making an elastomer from vulcanizing a compound of Claim 1.*

5. The previous Notice of Allowance filed on March 31, 2006 is now incorporated here by reference. In a close examination on the prior art as mentioned on the newly submitted IDS filed on June 30, 2006 along with a further examination and search, the examiner has found the following prior art did not teach the claimed limitation:

In this 2<sup>nd</sup> RCE, Applicants have again claimed two parent Claims 1 and 18 an unexpected way of obtaining a curable compound comprising: (a) an amorphous copolymer including inter-polymerized monomeric units which are derived from one or more perfluorinated vinyl ether monomers of **Formula I or II**; and (b) a curable component including at least one filler. The key point is that the cured compound (after vulcanization) has carried a combination of three properties as: (A) a Shore A hardness according to ASTM D2240 of 60 or greater, (B) a TR-10 of -25°C or less, and (C) a permeation of 65 (g-mm/m<sup>2</sup>-day) or less. It

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is noted that parent **Claim 18** relates to the process of making an elastomer from vulcanizing such a curable compound composition of parent Claim 1.

6. As discussed earlier regarding 102(a)/103(a) rejections for Claims 1-15 and 18-20 as well as 103(a) rejection for Claim 16, both rejections involve the use of **Grootaert** as sole or primary reference. In a close examination, the Examiner is only relying on inherent basis as the prior art and the present invention have recited substantially identical curable composition comprising fluorinated copolymers made from a claimed perfluoroalkoxyalkyl vinyl ether and **may be polymerized in the same process**, a reasonable basis exists to believe that the products of the invention inherently may thereby possess the same vulcanized properties on TR and permeation. The filing of Dr. Werner M. A. Grootaert's Affidavit on February 3, 2006 would overcome such a speculation. As clearly disclosed on Grootaert's Affidavit, "none" of the Examples described in the "760' patent has meet such a combination of three properties (see page 7 bottom of Remarks; also see pages 2-3 of Affidavit).

In a very close examination on 103(a) rejection for dependent Claim 16, the secondary reference **Guerra** only discloses when curing fluorocarbon elastomer mixture containing fluorinated ether composition, either a bisphenol curing system or a peroxide cure system can be readily used so as to obtain excellent low-temperature flexibility in the final product while remaining the desired physical properties. In summary, even it is the case that bisphenol curing system can be functionally equivalent and inter-changeable with Grootaert's peroxide curing system; Guerra still cannot fix the deficiency of Grootaert on characteristic properties.

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7. Applicant's first election filed on April 26, 2005 is directed to Group I (Claims 1-16 and 18-20) and with formula (I)  $\text{CF}_2=\text{CF}-\text{O}-(\text{CF}_2)_m-(\text{O}-(\text{CF}_2)_p)_n-\text{OR}_f$  with  $m = 1-4$ ,  $n = 0-6$ , and  $p = 1-2$  as the elected species. After a further search by this Examiner for checking other species with formula (II)  $\text{CF}_2=\text{CF}-(\text{CF}_2)_m-\text{OR}_f$  and with  $m = 1-4$ , it is found that **no cured polymeric composition obtained from formula (I), formula (II) or a mixture of formula (I) and formula (II) would carry such a combination of three properties.**

In a close examination of the four references cited in the **search report for Applicants'** PCT/US2003/028472, the examiner confirms that US-6,294,627 B1 to Worm et al. (cited as X), US-5,696,216 to Krueger et al. (cited as X), WO-99/48939 to Grootaert (cited as X) and USPG-PUB 2001/0008922 A1 to Abe et al. (cited as X) fail to teach or fairly suggest such a combination of three properties.

To be specific, patent of "627" may have prepared a copolymer containing units of a perfluoroalkoxyalkyl monomer (within formula I) and a nitrile cure-site monomer (column 6, line 22-29) to be cured with some bis(aminophenol)s, and the final product may have TR-10 at  $-56^\circ\text{C}$  (see table 5 on column 13; abstract, line 1-4); while the patents of "216", "939" and "922" have disclosed using polymers containing the claimed or similar vinyl ether monomer (within formula I) (see "939" on table 2 at page 14; see "922" on Table 2 at page 6; see "216" on column 7, line 60-63). None has taught or suggested such a combination of three properties on the cured or vulcanized product.

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8. After a check on all references including **14 US patents, 6 foreign patents and 15 non-patent references** as cited in new IDS, **only one** reference is involving in using the claimed perfluorinated vinyl ether. Therefore, **none of them anticipates all the limitations of parent Claims 1 and 18.**

To be more specific, **DE Patent 195,42,501 A1 to Krueger et al.** have used the claimed perfluorinated vinyl ether reading on Formula (I) in making a VDF-containing copolymer useful for peroxide crosslinking application (abstract, line 1-4; see the use of  $\text{CF}_2=\text{CF}-\text{O}-\text{R}_F$  wherein  $\text{R}_F$  is  $-(\text{CF}_2)_m(-\text{O}-\text{CF}_2)_n-\text{O}-\text{CF}_3$  on pages 2 and 3). However, it is not clear the copolymer is amorphous. Additionally, no curable component (b) is used and no claimed properties are disclosed or suggested.

9. It is known in the art that even the difference is only one carbon atom in the composition or a tiny extra step in making, the final polymeric products can be with very much different properties. Additionally, the present invention has already shown **unexpected results** (see page **8** of Remarks and page **14** of specification) in examples along with some comparative examples for making such curable compound composition (see page 11-15 for **examples 1-5, comparative examples C1-5** along with its **Tables 1-2**). Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

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In summary, the references in new IDS and the references mentioned before, in combination or alone, fails to teach or fairly suggest the limitations of present invention.

10. After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

**EP Patent No. 583,481 A1 to Kokumai et al.** discloses a curable perfluoroelastomer composition for molding, it comprises: (A) a perfluoroelastomer having units of TFE and 0.01-1.0 wt% of  $\text{CF}_2=\text{CF}-\text{O}-\text{X}$  monomer with X being a perfluoroalkyl C1-6 or a perfluoroalkoxyalkyl C4-9, (B) a curing agent, and (C) some filler additive (page 4, line 3-26 and 36-41; page 6, line 11-34; abstract, line 1-5). Some properties such as creep resistance and bending fatigue are disclosed. However, the claimed combination of three properties is not disclosed or suggested. Therefore, Kokumai fails to teach or fairly suggest the limitation of present invention.

**US Patent No. 6,613,846 B2 to Hintzer et al.** discloses a curable perfluoroelastomer composition comprising (A) a perfluoroelastomer having units of TFE, a  $\text{CF}_2=\text{CF}-\text{O}-\text{R}_f$  monomer (with  $\text{R}_f$  being a perfluoroalkyl or a perfluoroalkoxyalkyl) and a halogen-containing cure site monomer, (B) an organic peroxide, (C) a SiH-containing siloxane or silazane compound, and (D) some filler additive (abstract, line 1-10; column 5, line 17 – column 6, line 41; see fillers on column 8, line 1-17). Some properties are disclosed (see Table 1 on column 10). However, the claimed combination of three properties is not disclosed or suggested. Therefore, Hintzer fails to teach or fairly suggest the limitation of present invention.

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11. The key issue on the cured final product comprising inter-polymerized units from formula (I), (II) or its mixture, regarding **its combination of three properties** as: (A) a Shore A hardness according to ASTM D2240 of 60 or greater, (B) a TR-10 of  $-25^{\circ}\text{C}$  or less, and (C) a permeation of  $65\text{ (g-mm/m}^2\text{-day)}$  or less, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

12. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the two independent and parent **Claims 1 and 18** are allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending **Claims 2-16 and 19-20** are passed to issue.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu** whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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